

WIRELESS AUGMENTED REALITY PROTOTYPE (WARP)

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The Wireless Augmented Reality Prototype (WARP) Program was initiated in January 1997, under NASA's Office of Life and Microgravity Sciences and Applications. The objective of the WARP Program is in developing a wireless, wearable, hands-free interface to a remote computer system and out through its networked neighbors. The WARP program was conceived to support International Space Station astronauts; using WARP, an astronaut may efficiently operate and monitor any computer-controllable activity inside or outside the vehicle or station. From the basic system, however, there are numerous extensions to industrial, medical, and consumer markets.



WARP Operational Concept

The WARP concept is a lightweight, unobtrusive heads-up display with a wireless wearable control and communications unit. Connectivity to the external system is achieved through a high-rate radio link from the WARP personal unit to a base station unit installed on any system PC. Through this virtual terminal, the user will be able to view and manipulate imagery, text or video, using voice commands to control the terminal operations. WARP provides hands-free access to computer-based instruction texts, diagrams and checklists replaces juggling manuals and clipboards, and the tetherless computer system access allows free motion throughout a cabin while monitoring and operating computers or other equipment.

Along with computer information provided to the wearer, WARP also allows external observation of the user's situation; personal biosensors can send back continuous telemetry through the WARP control unit and a miniature camera integrated into the headset simultaneously provides real-time video of the wearer's field of view to remote observers. In this way, for example, a principal investigator located on Earth may consult with a payload specialist on the operation or troubleshooting of their equipment. The biosensor data channels may also be used for such control/input devices as a 3-D mouse or "data glove".

Development is underway on the Phase II system, available April 99, which uses custom commercial parts to achieve a baseline wearable unit for user demonstration and evaluations; the demo units will be the size of personal CD player and feature a lightweight (4 oz) headset.

To move from a prototype unit to a true production device suitable for long-term use and a increased base of customer applications, design has begun on Phase III, which will incorporate upgrades to next-generation displays (e.g. Sony) as well as fully custom chips and layout development at JPL, allowing size and power reductions down to the form-factor of small cell phone along with inherently greater flexibility for different applications.

Potential commercial/consumer applications of WARP are in any environment where heads-up, hands-free information retrieval improves efficiency, including tetherless operations/monitor consoles, remote consultations in medical or maintenance procedures, and hazardous or confined-space activities.